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Urban climate policy and the Nordic potential for carbon neutrality – the case study of city of Helsinki

Miejska polityka klimatyczna i potencjał państw nordyckich w obszarze neutralności klimatycznej. Helsinki – studium przypadku

Abstract: The aim of this article is to discuss urban climate policies, with a special focus on Helsinki, the fast growing capital of Finland. The precondition for the study is that metropolitan areas in Finland hold a central place for national climate policies due to their population and economic impact. The case study proves that the city, which had disadvantageous conditions for climate solutions in the early 90's, has successfully remodelled its approach and presently joins the group of world cities declaring carbon neutrality in coming years. The change was possible due to a favourable political climate, a multi-stakeholder and inclusive approach, public involvement, and the correlation between public and private initiatives. The study is based on statistical data, institutional analysis, and a comparison of the strategic documents of the city of Helsinki in the area of climate planning.
Keywords: urban climate policy, carbon-neutrality, Helsinki

Streszczenie: Celem artykułu jest omówienie miejskiej polityki klimatycznej z perspektywy trzech państw nordyckich w regionie Morza Bałtyckiego, ze szczególnym uwzględnieniem Helsinek, szybko rozwijającej się stolicy Finlandii. Warunkiem wyjściowym badania jest fakt, że obszary metropolitalne w Finlandii, Danii i Szwecji zajmują centralne miejsce w krajowej polityce klimatycznej ze względu na liczbę ich populacji i znaczenie gospodarcze. Studium przypadku – Helsinki – dowodzi, że miasto, które na początku lat 90. miało niekorzystne warunki dla rozwiązań klimatycznych, z sukcesem przemodelowało swoje podejście i obecnie dołącza do grona miast deklarujących neutralność węglową w najbliższych latach. Było to możliwe dzięki sprzyjającemu klimatowi politycznemu, inkluzji interesariuszy, zaangażowaniu społeczeństwa oraz korelacji między inicjatywami publicznymi i prywatnymi.

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Opracowanie opiera się na danych statystycznych, analizie instytucjonalnej i porównaniu dokumentów strategicznych miasta Helsinki w obszarze planowania klimatycznego
Słowa kluczowe: miejska polityka klimatyczna, neutralność węglowa, państwa nordyckie, Helsinki

Because urban citizens are the planet's majority, their natural rights are endowed with democratic urgency. They carry the noble name of "citizen", associated with the word "city". But the aim is not to set urban against rural: it is to restore a more judicious balance between them. Today it is cities that look forward, speaking to global common goods, while fearful nations look back.

Benjamin Barber[1]

Introduction

Mitigation and adaptation to climate change require actions at different levels, from international to national and local settings. Despite the overarching duties of nation states to create and introduce climate friendly policies, local players actually have key responsibilities in areas such as transport, land-use planning, water retention, and heating systems. Consequently, world urban areas constitute the most important variable on maintaining sustainability, as, according to International Energy Agency in 2013, urban regions accounted for 64% of global primary energy use and 70% of the planet's carbon dioxide emissions[2].

In the 21st century more and more cities are taking the opportunity to act as independent and devoted players in climate policy, supplementing or complementing national climate plans and regulations. Some of them are actually the frontrunners in introducing innovation hubs, clean urban technologies, and sustainable public patterns of behaviour. The aim of this article is to discuss urban climate policies from the perspective of Helsinki, the fast growing capital of Fin-

1 B. Barber, *How to fix climate change: Put cities, not countries, in charge*, The Guardian, 7 May 2017, https://www.theguardian.com/commentisfree/2017/may/07/fix-climate-change-put-cities-not-countries-in-charge-oslo-seoul [19.05.2021].

2 International Energy Agency, *Cities are at the frontline of the energy transition*, 7 September 2016, https://www.iea.org/news/cities-are-at-the-frontline-of-the-energy-transition [19.05.2021].

land. The hypothesis of the article assumes that Helsinki developed an ambitious and effective climate policy which became the core component of city strategic urbanism. This case study will be used to discuss the constant tendency to increase the level of ambition in local climate policies and research if the announced climate strategies are well-tailored for a city's present demands and future needs.

The research process rests on answering the following questions: what is the role of Helsinki for the national economy and, further, for climate policy; how have the level of climate ambitions evolved over the three last decades; to what extent do urban climate policies rest on multi-stakeholder approach; and has the Covid-19 pandemic has changed the city's approach to climate goals?

Verification of the hypotheses will be possible due to analysis of Helsinki's climate policy preconditions, discussion on climate strategies announced in the post-1990 period, and actual climate indicators. As the present regional urban trend builds on the concept of carbon-neutrality, it will be a kind of reference point not only to other cities' climate plans, but also to national levels of ambition.

1. Climate urbanism research

In general, the rise of research on the prominence of cities in global and national climate politics reflects a fundamental transition from state-centric approaches and multilateralism to sub- and non-state actors representing transnational and transformational arrangements[3]. Early research on urban climate politics was marked by many doubts whether cities could become active and constructive players in mitigating climate change. Suvi Monni and Frank Reas generalized in 2008 that "the role of local decision-making in mitigating a global problem like climate change is not straightforward" and is notably different than the example of mitigating local air pollution[4]. Even much later, urban activism was interpreted as a "temporary phenomenon"

3 C. Johnson, *Cities and the Global Politics of the Environment, Saviours, Supplicants or Agents of Change?*, Palgrave 2018, p. 3. See also: T. Hale, *"All hands on deck": The Paris agreement and non-state climate action*, "Global Environmental Politics" 2016, vol. 16, no. 3, pp. 12-22.

4 S. Monni, F. Raes, *Multilevel climate policy: the case of the European Union, Finland and Helsinki*, "Environmental Science & Policy" 2008, vol. 11, p. 744.

rather than a firm, global tendency[5]. Moreover, the problem of "free-riding" at the local level was indicated as possibly a typical answer to global public goods management[6].

Simultaneously, the development of multi-level governance research resulted in recognizing a more central role for different layers of authority, including urban one[7]. Most work was influenced by Elinor Ostrom's research discussing collective management at the local and community levels as the way to tackle multi-scale environmental problems[8]. According to Ostrom, collective actions in a self-organized system can be successful when "1) reliable information regarding the immediate and long-term costs and benefits of the actions is available; 2) the individual participants recognize the common pool resources as vital to their own accomplishments and focus on a long-term time horizon; 3) earning a name for being a trustworthy reciprocator is crucial to the participants; 4) communication is possible between individuals and at least a few of those involved; 5) informal monitoring and sanctioning are possible and appropriate; and 6) social capital and leadership are present, in connection with prior successes in resolving joint problems"[9].

More recent research on a polycentric approach, also within urban climate management, showed that it offers vast options for choice, experimentation, and learning. It boosts flexibility, innovation, trustworthiness, level of involvement, and, at the very end, enables more ambitious, equitable, and sustainable goals at multiple levels[10] to be accomplished. In that sense, cities are important arenas of experimentation, coining new plans and simply serving as "policy incubators for

5 T. Hale, op. cit.
6 C. Kousky, S. Schneider, *Global climate policy: will the cities lead the way?*, "Climate Policy" 2003, vol. 3, pp. 359-372.
7 For example: A. Michaelowa, P. Castro, Ch. Bagchi, *Report on Stakeholder Mapping: Multi-level Interaction of Climate Policy Stakeholders in the Run-up to the 2015 Agreement*, Zurich Open Repository and Archive, Zurich 2013.
8 E. Ostrom, *Polycentric Systems for Coping with Collective Action and Global Environmental Change*, "Global Environmental Change" 2010, vol. 20, pp. 550-557.
9 E. Ostrom, *A Multi-Scale Approach to Coping with Climate Change and Other Collective Action Problems*, "Solutions" 2010, vol. 1, no. 2, p. 31.
10 D. Cole, *Advantages of a Polycentric Approach to Climate Change Policy*, "Nature Climate Change" 2015, vol. 5, p. 115.

testing new approaches, documenting possible outcomes, sharing best practices and envisioning alternative policy futures"[11].

2. Urban politics of climate change – from voluntarism to carbon neutrality movement

By the late 1980's, many cities had begun their own actions to decrease local GHG (greenhouse gases) emissions. However, it was after the signing of the Kyoto Protocol in 1997 when cities felt a higher level of subjectivity that climate affords. According to Craig Johnson, the Kyoto Protocol had wide political functions as many cities used its language, and climate change in general, "to justify new forms of policy and investment at the urban scale"[12]. Still, at the time cities preferred limited actions, short-term programs, which were not bonded closely with overall development strategies. During the last decade, emergent methods of city climate management took the form of – as Haried Bulkeley names it – *strategic urbanism*[13]. Climate change actions have become one of the core reference points in the creation of long term approaches aimed at sustaining material reproduction of the city and making it more competitive and responsive to global trends.

Presently, one of the most visible labels or urban climate policies is a carbon neutrality goal that is set by the individual city independently from national climate goals. This is the most visible manifestation of urban climate ambitions that grow far beyond political inertia of national policy-makers and institutions. The four criteria for a carbon-neutral city assumes:

- Net-zero greenhouse gas emissions from fuel use in buildings, transport, and industry;
- Net-zero greenhouse gas emissions from the use of grid-supplied energy;
- Net-zero greenhouse gas emissions from the treatment of waste generated within the city boundary;

11 C. Johnson, op. cit., p. 8.
12 Ibid., p. 6.
13 H. Bulkeley, *Climate changed urban futures: environmental politics in the Anthropocene city*, "Environmental Politics" 2021, vol. 30, no. 1-2, p. 267.

Where a city accounts for additional sectoral emissions in their GHG accounting boundary, net zero greenhouse gas emissions from all additional sectors in the GHG accounting boundary[14].

Many cities from various regions, including Berlin, Boston, London, San Francisco, and New York, have set their individual carbon neutrality targets for 2050 or even earlier, as is the case with Sydney and Hague for 2040, and Helsinki for 2035. Copenhagen is a true leader and laboratory of change with a target of 2025.

The strong devotion of many cities to sustaining a high level of climate activities and the need to share the most effective urban solutions resulted in the creation of a permanent carbon neutrality movement cutting across jurisdictions and based on voluntary pledges. The largest world cities belong to the coalition Cites40, consisting of more than 90 members[15]. The Carbon Neutral City Alliance is also an important forum for cooperation among bigger cities. Local authorities collaborate within ICLEI – Local governments for sustainability – a global network of more than 2500 local and regional governments committed to sustainable urban development active in 125+ countries[16]. The most widespread initiative is the Global Covenant of Mayors for Climate & Energy, which brings together 10,000 representatives from the European Union's Covenant of Mayors and the Compact of Mayors aiming together at advancing city-level transition to a low emission and climate-resilient economy[17]. These and many more global and local initiatives were finally incorporated to the UNFCCC process at the Paris Summit in 2015 through the Marrakech Partnership for Global Climate Action, encompassing non-state actors like businesses, cities, regions, and NGO's[18].

The effectiveness of these actions is ambiguous to a certain degree. The above mentioned "strategic urbanism" is more of a promise

14 C40 Cities, *Defining Carbon Neutrality for Cities & Managing Residual Emissions – Cities' Perspective & Guidance*, p. 11, https://c40-production-images.s3.amazonaws.com/researches/images/76_Carbon_neutrality_guidance_for_cities_20190422.original.pdf?1555946416 [20.05.2021].

15 C40 Cities, https://www.c40.org [20.05.2021].

16 ICLEI – Local governments for sustainability, https://iclei.org/en/what_we_do.html [20.05.2021].

17 Global Covenant of Mayors for Climate & Energy, https://www.globalcovenantofmayors.org/who-we-are/ [20.05.2021].

18 S. Chan et al., *Reinvigorating international climate policy: A comprehensive framework for effective nonstate action*, "Global Policy" 2015, vol. 6, no. 4, pp. 466-473.

than a real condition that is actually delivered. Even examples from the most affluent countries prove that the terrain for urban actions is often limited to formal planning, enumerated in city climate strategy, and only partly incorporated into wider public policies spectrum. Research made by Jani Laine, Jukka Heinonen, and Seppo Junnila on city of Vantaa in Finland, a progressive example of setting carbon neutrality goal by 2030, has proven that municipal authorities have a narrow scope for actions because most carbon neutrality decisions are anchored within either private entities or national actors with broader jurisdictions[19]. Also, other studies of Danish municipalities show that local energy planning needs elements of centralized planning in order to fulfil sustainability goals[20]. Despite the evidence pointing to obstacles in local climate actions, most of the Nordic cities, including Helsinki, still lead the way in setting climate goals in comparison to other developed metropolises, the result of long-standing national climate policy determination.

3. Finland – from national to local perspective

Starting in the early 1990s, Finland introduced intensive low-carbon policies aimed at reducing emissions and increasing energy efficiency. These actions constituted one of the elements of a wider sustainable development agenda incorporated into all public activities that began in the 80's. The country also actively started to promote its green image on the international stage and became an environmental entrepreneur outside regional settings, although with poorer effects than other Nordic countries. Starting in 1995, Finnish authorities began to follow the European Union climate accords, including the most ambitious climate neutrality goal.

Finland's energy and climate strategies were mostly conditioned by a very cold climate, energy-intensive industries, and long distances. The country's present green strategies are mostly based on developing bioenergy and construction of two additional nuclear power plants,

19 J. Laine, J. Heinonen, S. Junnila, *Pathways to Carbon-Neutral Cities Prior to a National Policy*, "Sustainability" 2020, vol. 12, no. 6, p. 13.

20 K. Sperling, F. Hvelplund, B.V. Mathiesen, *Centralisation and decentralisation in strategic municipal energy planning in Denmark*, "Energy Policy" 2011, vol. 39, pp. 1338-1351.

which help to reduce coal dependency. Finland is a global leader in the production of second-generation biofuels from wood, most notably biodiesel, and in effect, around 30% of total energy supply depends on biofuels and waste, which represents the highest score for all International Energy Agency countries. Due to very high standards in the construction sector, district heating is relatively energy efficient. The most problematic area in terms of CO2 reduction is transportation, which remains the most carbon-intensive sector of the Finnish energy system[21].

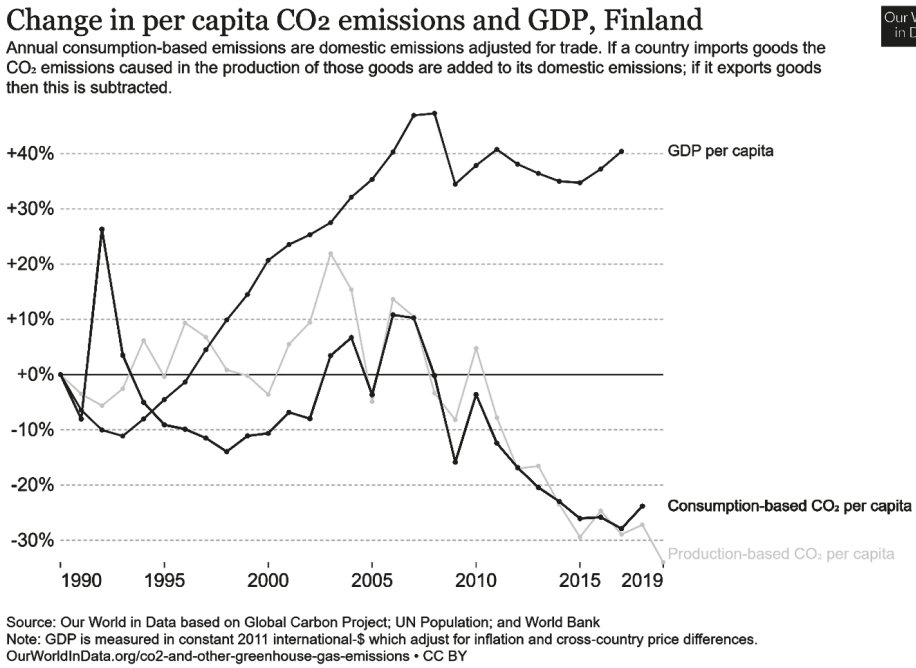
The main operating tool of the sustainable economy in Finland is the concept of "green growth". The Organisation for Economic Co-operation and Development defines green growth as being "about fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. It is also about fostering investment and innovation, which will underpin sustained growth and give rise to new economic opportunities"[22]. In that sense, the country managed to decouple its economic growth from GHG emissions. In 2017 GDP growth compared to 1990 amounted to 40.41%, while consumption-based CO2 per capita dropped by 27.90% – Chart 1[23].

21 International Energy Agency, *Energy Policies of IEA Countries: Finland 2018 Review*, https://www.iea.org/reports/energy-policies-of-iea-countries-finland-2018-review [20.05.2021].

22 OECD, *Towards Green Growth*, Paris 2011, p. 18.

23 Our World in Data, *Finland: CO2 Country Profile*, https://ourworldindata.org/co2/country/finland [13.08.2021].

Chart 1

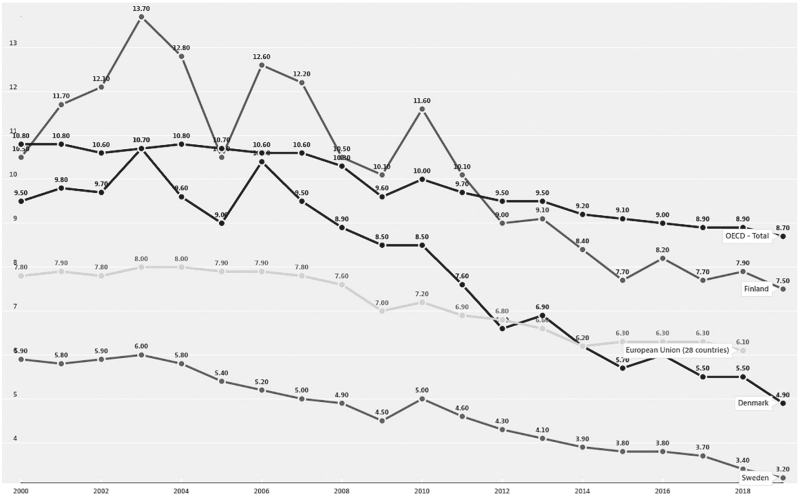


Source: Retrieved from: https://ourworldindata.org/co2/country/finland [13.08.2021].

Still, if one considers emissions per capita, Finnish records are moderate. In 2019 each Finnish inhabitant produced 7.5 tonnes, which is less than the OECD average (8.70 t/per capita), but simultaneously more than the EU average (6.10 t/per capita in 2018) and decidedly more than other Nordic EU members – 3.2 tonnes for Sweden, 4.9 tonnes for Denmark – Chart 2[24].

24 OECD online database, https://data.oecd.org/air/air-and-ghg-emissions.htm [20.05.2021].

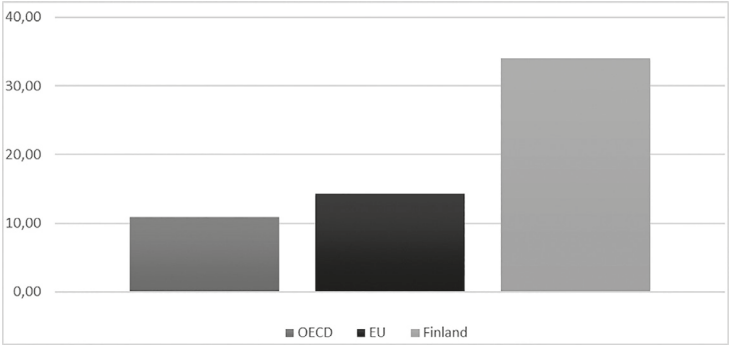
Chart 2. Emissions in tons per capita (2000-2019)



Source: OECD database, https://data.oecd.org/air/air-and-ghg-emissions.htm [20.05.2021].

Despite the relatively high CO_2 production per capita, Finland holds a leading position in terms of sustainable energy mix. For example, compared to other EU members' share of renewable energy, Finland (34%) was in 2019 more than two times higher than the EU average (14.3%) – Chart 3[25].

Chart 3. Renewable energy – % of primary energy supply (2019)



Source: OECD database, https://data.oecd.org/air/air-and-ghg-emissions.htm [20.05.2021].

25 Ibid.

Keeping in mind the indictors in the chart, there is a need to locate the social and economic place of the capital city in a wider national context. Helsinki is the only city in the country that meets the OECD understanding of the metropolitan area as a region with a population exceeding 500,000 residents. As is the case in other Nordic countries, with their relatively small populations, the capital plays a crucial role not only as a political centre, but also an economic and cultural development hub.

The Helsinki metropolitan area, with less than 1/3 of the country's population between 2000 and 2016, created 35% of national GDP and 30% of employment. The city also generated 45% of national GDP growth. However, in the same respective period, the metropolitan area of Copenhagen accounted for 43% of national GDP and 40% of employment, and it generated 66% of national GDP growth. In Sweden, the three biggest metropolises generated 47% of national GDP and 57% of national GDP growth in the same period. In terms of GDP per capita, all Nordic capitals are in the top 25% of the 327 OECD Metropolitan areas[26].

The above indicators are of great importance in terms of Helsinki's climate policy. The city takes a central place in national development strategies due to its economic and social power, including in comparison to other more developed world regions. To a high degree, the success of urban climate policies of the capital will influence and shape national ambitions and the ability to put them in practice.

4. Urban climate ambitions – the case of Helsinki

The Finnish capital is undoubtedly one of the fastest growing cities in Europe. Its economic growth expanded to 65% since 1990 but was accompanied by a strong sustainability perspective[27]. Sunni Moni and Frank Raes claim that "The capital of a wealthy and stable nation-state, Helsinki likes to emphasize its 'green' credentials, from forested landscapes to resource efficient everyday like, and it boasts substantial

26 Ibid.
27 Carbon Neutral Cities, *Helsinki*, https://carbonneutralcities.org/cities/helsinki/ [20.05.2021].

urban green space despite recent densification"[28]. Having in mind this characteristic, municipal climate policy seems to be a natural continuation of wider sustainable efforts undertaken for decades now.

In the 90's, as in many European countries, the goals of a national climate policy were centralized and not allocated to lower levels of authority[29]. The biggest challenge for the city was energy production based on coal and natural gas. Helsinki differentiated negatively from other parts of the country, where renewables were gaining momentum, and did not follow the EU standards (the Directive on renewable electricity, 2001/77/EC). Despite national tax schemes and investment subsidies introduced at the national level, the promotion of renewables in Helsinki did not reach satisfactory levels. As a result, a locally tailored solution based on existing infrastructure was initiated with the production of heat by cogeneration of hydrocarbons with biofuels.

These poor achievements in renewable solutions for the city were slightly counterbalanced by its very strong record in energy savings in the building sector. This has been due to the harsh climate and the need to sustain the security of supplies not only locally in the capital but nationwide. In effect, Finnish standards were even higher than the EU norms (The directive on energy performance of buildings (2002/91/EC), and the country had only to adjust to the energy certificate system.

However, the most innovative city strategies were introduced in the transportation sector. This area differs from others public policies in that it only marginally falls under national or EU jurisdictions. Most decisions on land use planning and promotion of public transportation are taken at the local level. In contrast to the lack of progress in biofuels use in the transportation sector throughout the country, Helsinki led the way with the introduction of second-generation fuels to its fleet. The relative simplicity of actions in this area was accompanied by substantial by-products, like air-quality benefits[30].

28 S. Monni, F. Raes, *Multilevel climate policy…*, p. 743; More: M. Hannikainen, *Planning a Green City: The Case of Helsinki, 2002-2018* [in:] *Planning Cities with Nature Theories, Strategies and Methods*, F. de Oliveira, I. Mell (eds.), Springler 2019.

29 J. Gupta, R. Lasage, T. Stam, *National efforts to enhance local climate policy in the Netherlands*, "Environmental Sciences" 2007, vol. 4, no. 3, pp. 171-182.

30 More: City of Helsinki, *Analysis of future transport in the City of Helsinki*, Urban Environment publications 2020:36, https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/julkaisu-35-20-en.pdf [11.09.2021].

Sunni Moni and Frank Raes claimed that "the coherence of national and city level policies is the highest in regulated areas, such as waste management and building regulation. Voluntary action is easily taken at local level in areas where co-benefits can be expected: e.g. energy conservation and biofuels for transportation"[31]. This leads to the conclusion that Helsinki, in fact, tends to concentrate on measures bringing direct benefit to the city in the short term. Simultaneously, the authors proved that Helsinki did not follow EU and national renewable electricity targets due to barriers like inaction by the city authorities and contradicting private interests[32].

Consequently, considering the general results, Helsinki was not sufficiently successful in its early climate efforts. The city's emission of greenhouse gases did not change between 1990 and 2006, although they corresponded with the national Kyoto target set for Finland (0% compared to the base year) and showed better tendency than national GHG emissions that were on increasing trajectory.

The urgent need for a more coordinated approach by city authorities was evident. The first comprehensive climate strategy of Helsinki based on voluntary climate actions was taken at the level of the Helsinki Metropolitan Area and published in 2007. The strategy aimed to reduce GHG emissions by 39% of the 1990 level by the year 2030. It also indicated that it would cut per capita emissions by one third of the 2004 level by the year 2030[33]. In 2012 the strategy was complemented with the Helsinki Metropolitan Area Climate Change Adaptation Strategy, with comprehensive measures to adjust the city to changing climate patterns, weather conditions, and natural hazards[34].

A new vision of future climate policy was presented in 2013. With a perspective on reaching 2050 outcomes, it included goals to reduce GHG emissions by 30% by the year 2020 from the 1990 level, and for the first time carbon neutrality in 2050 was undertaken. The proposed means included technological transportation solutions like robot cars

31 S. Monni, F. Raes, *Multilevel climate policy…*, p. 743.
32 Ibid.
33 Helsinki Metropolitan Area Council, *Climate Change in Focus in Helsinki Metropolitan Area. Helsinki Metropolitan Area Climate Strategy 2030*, Helsinki 2007.
34 Helsinki Region Environmental Services Authority, *Helsinki Metropolitan Area Climate Change Adaptation Strategy*, Helsinki 2012, https://ilmastotyokalut.fi/files/2014/10/11_2012_Helsinki_Metropolitan_Area_Climate_Change_Adaptation_Strategy.pdf [20.05.2021].

and Demand Responsive Transportation, new city planning aimed at densification of the city structure, and sustainable energy solutions in the city[35].

By 2016 city authorities approved a new Helsinki City Strategy 2017-2021 with the primary aim to make Helsinki a climate-friendly city. The strategy acknowledged its "modern climate responsibility" and assured citizens that "in whatever it does, Helsinki underlines ecological values and, consequently, strives to join the C40 climate network of the leading cities of the world. Helsinki profiles itself as an internationally networked pioneering local implementer of global responsibilities"[36]. The visible global shift in climate efforts of the Finnish capital resulted in its joining all major, urban, international networks with high climate ambitions, among them the Carbon Neutral City Alliance, Local governments for sustainability, and the Global Covenant of Mayors for Climate & Energy.

Finally, in 2018 the goal of climate neutrality by the year 2035[37] was undertaken. The national government confirmed the same level of ambition one year later[38]. Helsinki was, however, no exception to other Finish cities, which also declared high ambitions for carbon neutrality: Turku (2029), Espoo (2030), Tampere (2030), and Vantaa (2030)[39]. City authorities in Helsinki were fully aware of the obstacles to their ambitious goals and divided the reduction burden into two parts: 80% of emissions will be reduced in Helsinki, and the remaining 20% will be compensated by the city financing various reduction programmes outside the city. The Action Plan identified 147 total actions, with 30 actions for traffic and transportation and 57 actions for construction. The rest covered areas like consumption, procurements,

35 City of Helsinki, *Helsinki city plan: vision 2050*, Reports by the Helsinki City Planning Department general planning unit 2013, no. 23, p. 12, https://www.hel.fi/hel2/ksv/julkaisut/yos_2013-23_en.pdf [20.05.2021].

36 City of Helsinki, *The Most Functional City in the World: Helsinki City Strategy 2017-2021*, https://www.hel.fi/helsinki/en/administration/strategy/strategy/city-strategy/ [11.08.2021].

37 City of Helsinki, *The Carbon-neutral Helsinki 2035 Action Plan*, Publications of the Central Administration of the City of Helsinki 2018, no. 4, https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/HNH-2035/Carbon_neutral_Helsinki_Action_Plan_1503019_EN.pdf [20.05.2021].

38 United Nations, *Finland will achieve carbon neutrality by 2035*, The Partnerships platform for SDGs, https://sustainabledevelopment.un.org/partnership/?p=33186 [20.05.2021].

39 J. Laine, J. Heinonen, S. Junnila, op. cit., p. 13.

sharing and circular economy, reduction of residents' carbon footprint, and the advancement of Smart & Clean business[40].

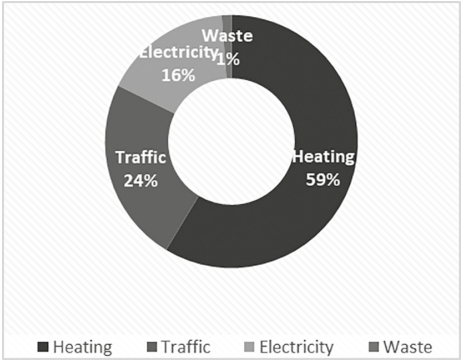
The strategy underlined the need to involve various private and public groups, like residents, companies, administration, and national authorities, in decision-making, but it also highlighted the meaning of innovative approaches and flexibility as keys to success. The process of creating the document was long and inclusive, based on an extensive process of collaborative negotiations and consultations between public institutions like Helen Ltd (city energy producer), Helsinki Regional Transport, and Helsinki Region Environmental Services Authority, but also the Smart & Clean Foundation, and Divisions of the City of Helsinki. Dialogue with citizens was also initiated by open public hearings and broad, online consultations[41]. It is also worth adding that the decision on the climate goals was not a subject of sharp political conflict, as most local political parties and groups share in their green credentials and gave way to specialists and the public.

5. The outcomes of Helsinki climate affords

The above discussed urban planning proves that the Helsinki authorities made climate efforts, including climate neutrality, a core element of strategic development of the metropolis. Still, a questions remains: to what extent were formal declarations transformed into actual action. From 1990 to 2020, Helsinki has managed to decrease its emissions by 27%, but still there is strong need to increase the decarbonization process. Almost 60% of emissions in the city are generated by heating, around 24% by traffic, and 16% by electricity production (Chart 4)[42].

40 City of Helsinki, *The Carbon-neutral Helsinki 2035…*, p. 8.
41 More: Helsingin ilmastoteot, https://helsinginilmastoteot.fi [20.05.2021].
42 Carbon Neutral Cities Alliance, Helsinki, https://carbonneutralcities.org/cities/helsinki/ [20.05.2021].

Chart 4. Helsinki GHG emissions by source, 2020



Source: Helsinki, Carbon Neutral Cities Alliance, https://carbonneutralcities.org/cities/helsinki/ [20.05.2021].

The main challenge for the city still relates to modernization of its electricity production, which is still based on coal (Table 1).

Table 1. Electricity mix of Helsinki (%), 2020

Coal	43
Gas	34
Nuclear	11
Hydro	5.8
Geothermal	4.2
Biomass	1.5
Wind	0.5
Solar, oil	0

Source: Carbon neutral cities, https://carbonneutralcities.org/cities/helsinki/.

Undoubtedly the future speed of achieving carbon goals is conditioned by the pace of economic and demographic growth of the city. The city's population increases by app. 8,000 every year, and since 1990 it has grown with 150,000 newcomers. Still, emissions per capita in Helsinki decreased by 40% compared to 1990. With a "business as usual" scenario, meaning that all the decisions already agreed upon till 2018 are adhered to (for example, by stopping the use of coal in the Hanasaari power plant in 2024), emissions would still be reduced

by approximately 52% by 2035, compared to 1990[43]. In effect, it is estimated that about half of reductions can be introduced with the use of existing programmes of local and national authorities, while the other half will depend on successful introduction of the Action Plan.

The question of whether the pandemic of COVID-19 will modify or even hinder the implementation of the strategy also remains. In 2020, despite some economic and social problems, the city arranged the year-long international Helsinki Energy Challenge with the aim to find the best low-carbon solutions to reduce emissions from heating, which constitute nearly 60% of the capital's emissions[44], suggesting that support for innovative technologies still remains a key tool to speed ecological modernisation of the city. Moreover, a strong emphasis is being given to public-private networking. Private companies can enter a network of the Climate Partners, whose members share knowledge on best practices and communicate the results. All institutions, including universities, colleges, and other organisations, can participate in the cooperation as "support members". Most on-going projects, like circular city, smart-city, or green public procurement, were not stopped. Helsinki also advances monitoring and informing the public about climate progress, as all results are displayed on its webpage[45]. Consequently, one can expect continuation rather than change in terms of climate programmes, although some modifications are highly possible.

Conclusions

Undoubtedly cities are the key players for future low-carbon modernisation. The density of all capitals (human, economic, and intellectual) make them unique driving forces for the acceleration of clean development in all sectors of the economy and social activities. The implementation of climate goals modifies deeply not only city material settings through construction and use of buildings, means of transport, traffic, and heating systems, but also economic patterns con-

43 City of Helsinki, *The Carbon-neutral Helsinki 2035…*, pp. 7-8.
44 Helsinki Energy Challenge, https://energychallenge.hel.fi/ [20.05.2021].
45 Climate Watch Website, https://ilmastovahti.hel.fi/ [20.05.2021].

nected to business, tourism, procurements, local sharing economies, or circular economies. It also restructures human behaviour in terms of consumption, local involvement, or political and social activism. Social consequences are far-reaching, from changing employment patterns, the well-being of residents, especially groups most prone to climate change like old aged-pensioners and children, the health of the residents (for example, a decrease in smog emissions), to more general social inclusion. In the long run the assumption may be made that successful local climate policy will affect local political arenas of cooperation and conflict. Hence, cities as incubators of initiatives might show the feasibility of certain measures and pave the way for their implementation at the national and the EU level.

Helsinki may be named a successful but still not fully accomplished example of high climate ambitions. As Eeva Berglund and Guy Julier claim, the city "with its pro-environmental administration, is an example of combining 'green' agendas with a culture of growth and depoliticizing debate"[46]. However, to reach this stage, the city needed more than three decades, as evidence from the early 90's showed that local solutions for climate protection were not sufficient, especially in terms of renewable energy programmes. Extensive initiatives in the area of public transportation and heating paved the way to more ambitious and visionary plans, culminating in 2018 with the declaration of achieving carbon neutrality by 2035. In effect, the hypothesis claiming that climate policy goals became the core component of Helsinki strategic urbanism can be positively confirmed. Helsinki joined the leading group of world cities which set more ambitious goals than their national governments.

It is too early to verify if the plan can be fully implemented, as it depends not only on local determination but also national policies and global trends. However, the process of formulating a new vision for the city holds promise for its application because a systemic approach was undertaken. All major city institutions, the authorities, the public, and the business community were involved, which created an inclusive character for decision-making. Besides the multi-stake-

46 E. Berglund, G. Julier, *Growth in WEIRD Helsinki: Countering Dominant Urban politics and its "Green" Pretentions*, "Sociálni studia" 2020, no. 1, p. 13.

holder approach, the plan rests on both individual and collective actions in all spheres of city's activities, and it rests on both top-down guidance based on the city's regulations and bottom-up actions by its inhabitants.

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